A COMPARATIVE STUDY ON THE EFFECTIVENESS OF MODIFIED CONSTRAINT INDUCED MOVEMENT THERAPY(MCIMT) AND HAND-ARM BIMANUAL INTENSIVE THERAPY(HABIT) ON IMPROVING GROSS MANUAL DEXTERITY FOR SPONTANEOUS USE OF AFFECTED RIGHT UPPER EXTREMITY IN RIGHT SPASTIC HEMIPLEGIC CEREBRAL PALSY CHILDREN.

A Dissertation Submitted to

THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITYCHENNAI

In partial fulfilment of the requirementsfor the award of the

MASTER OF PHYSIOTHERAPY

Degree Programme

Submitted by

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PPG COLLEGE OF PHYSIOTHERAPY

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OTOBER – 2016

The Dissertation entitled

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Under the guidance of

Prof.Dr.S.JOEL GODFREY BETRAM M.P.T (Neurology), MIAP.,Ph.D

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Dissertation Evaluated on _____

Internal Examiner **External Examiner**

CERTIFICATE I

This is to certify that the dissertation entitled **"A COMPARATIVE STUDY ON THE EFFECTIVENESS OF MODIFIED CONSTRAINT INDUCED MOVEMENT THERAPY(MCIMT) AND HAND-ARM BIMANUAL INTENSIVE THERAPY(HABIT) ON IMPROVING GROSS MANUAL DEXTERITY FOR SPONTANEOUS USE OF AFFECTED RIGHT UPPER EXTREMITY IN RIGHT SPASTIC HEMIPLEGIC CEREBRAL PALSY CHILDREN** is a bonafide compiled work, carried out by **Register No: 271420201,** PPG College of Physiotherapy,Coimbatore-641035 in partial fulfilment for the award of degree in Master of Physiotherapy as per the doctrines of requirements for the degree from**THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI-32.** This work was guided and supervised by **Prof.DrS.JOEL GODFREY BETRAM M.P.T(Neurology).,MIAP.,Ph.d**

DATE: **PRINCIPAL**

PLACE:

CERTIFICATE II

This is to certify that the dissertation entitled **"A COMPARATIVE STUDY ON THE EFFECTIVENESS OF MODIFIED CONSTRAINT INDUCED MOVEMENT THERAPY(MCIMT) AND HAND-ARM BIMANUAL INTENSIVE THERAPY(HABIT) ON IMPROVING GROSS MANUAL DEXTERITY FOR SPONTANEOUS USE OF AFFECTED RIGHT UPPER EXTREMITY IN RIGHT SPASTIC HEMIPLEGIC CEREBRAL PALSY CHILDREN** is a bonafide compiled work, carried out by **Register No: 271420201,** PPG College of Physiotherapy,Coimbatore-641035 in partial fulfilment for the award of degree in Master of Physiotherapy as per the doctrines of requirements for the degree from**THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI-32** under my guidance and supervision.

Prof.Dr.S.JOEL GODFREY BETRAM

M.P.T (Neurology)., MIAP.Ph.D.,

ACKNOWLEDGEMENT

TO MY CREATOR

…… You removed my sack cloth and clothed me with joy ,that my heart may sing to you and not be silent.O lord my God ,Iwill give thanks for ever .

Psalm.30:11,12

To my hearts

I am greatly indebted to **my family** as always their infinite love and support has emboldened me to venture on this onerous task.

My heart felt gratitude;

To my college chairman and correspondent

DR.L.P.THANGAVELU M.S.,F.R.C.S,

Mrs. SHANTHI THANGAVELU M.A

For their encouragement during different phases of my study

To my college principal

Prof. Dr. K.S. RAJA SHENTHIL M.P.T (Cardio),MIAP, PhD for his constant support and guidance throughout the course of my study and without whom my PG life would not have seen light.

To my guide

Prof. Dr. S.JOEL GODFREY BETRAM M.P.T (neurology), ,MIAP.,Ph.D for his content suggestions, pedagogical insights thus helping me to accomplish this mammoth task

A special thanks to my class co-ordinator Asst Prof .K.RAMADEVI M.P.T (cardio respiratory) and all ***faculty members*** for their support. I would also like to thank my friends and juniors for their valuable and selfless assistance rendered .I find it hard to put my words in thanks.

Last but not the least, I thank all my Little's on whom this project was studied and carried out successfully.

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ABSTRACT

BACKGROUND AND PURPOSE OF THE STUDY

Recent neuro-rehabilitation concepts have emphasized what children do in their actual environment rather than what they do in a standardized environment. Newly developed activity based interventions including Modified constraint induced movement therapy (MCIMT) and Hand arm bimanual intensive therapy(HABIT) provide evidence for the improvement of hand functioning. The purpose of this study is to provide additional research evidence. This research project intended to compare the effectiveness of MCIMT and HABIT on clinical outcome measures for children with right spastic hemiplegic cerebral palsy on improving gross manual dexterity.

METHODOLOGY

15 children with right spastic hemiplegic cerebral palsy were treated with MCIMT and 15 children with right spastic hemiplegic cerebral palsy were treated with HABIT. Interventions lasted for 3 months. BOX AND BLOCK test was used to assess gross manual dexterity before and after intervention.

RESULTS

Statistically there is no significant improvement but clinically the treatments can be incorporated into practice. So the null hypothesis is accepted as the independent ‘t’ test post values table value (2.045) is greater than the calculated value (t value is 2).

CONCLUSION

Children treated with HABIT recovered to the same extent as children treated with MICMT.

KEY WORDS

Spastic hemiplegic cerebral palsy CP, modified constraint induced movement therapy (MCIMT), hand arm bimanual intensive therapy (HABIT), gross manual dexterity.

CHAPTER-I

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Cerebral palsy (CP) describes a group of disorders of the development of movement and posture causing activity limitation that are attributed to non progressive disturbances that occurred in developing fetal or infant brain which includes motor disorders accompanied by disturbances of sensation , cognition, communication, perception and /or behaviour and/or by seizures disorders.[1]

According to WHO (jan 2013) Nearly15-20% of the total physically handicapped children suffer from CP. For India , the estimated incidence is around 3/1000 live births however ,being a developing country, the actual figure may be much higher.[2]

The impact of CP on a child's hand functioning may be formalized through the theoretical framework of the International Classification of Functioning, Disability, and Health (ICF) [3].According to the ICF, CP may affect three separate but related domains of functioning: body functions and structures (body domain), activities (individual domain), and participation (social domain). In the present work, only the body and individual domains were considered, as the social dimension cannot be reduced to the sole functioning of the hands. Body functions include the physiological or psychological functions of the different body systems. Body structures refer to the anatomic parts of the body (e.g., organs, limbs, and their components). By definition, CP is a consequence of early brain lesions that may affect the corticospinal tract. CP may impact the hand and its components (e.g., muscles, joints, and bones), as well as several body functions (e.g., muscle strength, control of rapid coordinated movements, touch-pressure detection, and recognition of common objects and shapes). CP may also limit the ICF domain of activities, which refers to the ability to execute an essential task or action of daily living (e.g., eating, drinking, grooming, or dressing). , the term "hand skills" used refer to hand functions (ICF body domain) and hand mobility (ICF activity domain, mobility subdomain).

The term “manual ability” (MA) will be used to refer to the children’s touch-pressure detection (TD), grip strength (GS), gross manual dexterity (GMD), and fine finger dexterity (FFD).

The impairments of hand function is often the result of damage to the motor cortex and cortico spinal pathways responsible for the fine motor control of the fingers and hand.[4] Reducing hand dysfunction or impairments in CP manages a number of activities . Individuals with hemiplegia have impairments in one of their upper extremities.A growing body of evidence suggests that the inclusion of constraint induced movement therapy and bimanual therapy in therapeutic programming may be beneficial for patients with hemiplegia.

The idea that residual (masked) capability could potentially be tapped into by foced use of the deafferentated or impaired limb drove the development of intensive practice based therapies in humans.MCIMT is a relatively new intervention derived from the basic sciences.The MCIMT protocol stems directly from basic research with monkeys .MCIMT has been adopted as a method of teaching a child to use his or her affected upper limb through the use of a restraint on thenon affected limb and massed practice of movements of the affected limb.[5] An other intervention recently in practice is a child –appropriate form of task oriented intensive functional training, Hand arm bimanual intensive therapy (HABIT) improves the amount and quality of involved UE use during bimanual task[6] The BB test has strong clinical utility in the assessment of neurologic impairment , musculoskeletal impairment , and in the elderly .[7-9] Box and Block test assessment is appropriate to use in various settings, such as in inpatient, rehabilitation, outpatient, or even in the client’s home. This test and required material can be transported to any of the mentioned environments where it is necessary to address unilateral gross dexterity. Test does not require any additional qualifications of training. This is a simple test to administer. The score is the number of blocks carried from one compartment to the other in one minute

1.2 NEED OF THE STUDY

As there was a continuous gap in the knowledge related to use MCIMT and HABIT with patients, recent data collection may provide stronger support to ensure therapists to implement the above mentioned therapies to achieve the best patient outcomes.

1.3 AIM OF THE STUDY

To compare the effectiveness of MCIMT and HABIT on improving gross manual dexterity in spastic hemiplegic cerebral palsy children.

1.4 OBJECTIVES OF THE STUDY

- To evaluate the effectiveness of MCIMT on improving gross manual dexterity in spastic hemiplegic cerebral palsy children.

- To evaluate the effectiveness of HABIT on improving gross manual dexterity in spastic hemiplegic cerebral palsy children.

- To compare the effectiveness of MCIMT and HABIT on improving gross manual dexterity in spastic hemiplegic cerebral palsy children.

1.5 HYPOTHESIS

- **NULL HYPOTHESIS:**

There was no statistically significant improvement in gross manual dexterity in spastic hemiplegic CP children when treated with HABIT than MCIMT.

- **ALTERNATE HYPOTHESIS:**

There was statistically significant improvement in gross manual dexterity in spastic hemiplegic CP children when treated with MCIMTthan HABIT.

There was statistically significant improvement in gross manual dexterity in spastic hemiplegic CP children when treated with HABIT than MCIMT.

1.6 OPERATIONAL DEFINITION:

SPASTIC HEMIPLEGIC CEREBRAL PALSY:

Hemiplegia in infants and children is a type of cerebral palsy that results from damage to the part (hemisphere) of the brain that controls muscle movements.This damage may occur before ,during or shortly after birth.

-MUNDKUR N 2005

GROSS MANUAL DEXTERITY:

It is the ability to make coordinated hand and finger movements to grasp and manipulate objects.Manual dexterity includes muscular, skeletal and neurological functions to produce small, precise movements.

-BRI MAKOFSKE 2011

MODIFIED CONSTRAINT INDUCED MOVEMENT THERAPY:

The MCIMT is a relatively new intervention derived from the basic sciences. Mcimt involve the application of a restraint with less than 3 hours per day and type of constraint can be different. Modified CIMT vary in frequency ,duration and type of constraint in treatment regimen.

- ROSTAMI HR 2012

HAND ARM BIMANUAL INTENSIVE THERAPY:

HABIT is a child appropriate form of task oriented intensive functional training,which aims to improve the amount and quality of involved UE use during bimaual tasks.

-CHARLES J 2006

CHAPTER-II

REVIEW OF LITERATURE

MODIFIED CONSTRAINT INDUCED MOVEMENT THERAPY

1.EFFECTS OF MODIFIED CONSTRAINED INDUCED MOVEMENT THERAPY TO IMPROVE THE UPPER LIMB FUNCTIONAL ACTIVITIES AND GROSS MANUAL DEXTERITY ON HEMIPARETIC CEREBRAL PALSY CHILDREN.

Seema.et.al., 2015

Impaired hand function is a major debilitating factor for the performance of activities of daily living in hemiplegic cerebral palsy.The impairment of the hand is often the result of damage to the motorcortex and cortico spinal pathways responsible for the fine motor control of the fingers and hand [10] . Recent evidence suggests that children with CP may improve motor performance if provided with sufficient opportunities to practice. One treatment approach that is becoming increasingly popular is constraint-induced movement therapy (CIMT). Constraint Induced Movement therapy is a new technique used in physical rehabilitation to treat individuals with decreased upper extremity functions. It involves constraining the unaffected limb, along with intense therapy, in order to force the use of the affected side with the intent to improve motor function. It is a task driven treatment that combines principles of behavioural psychology and motor learning [11-15] .Modified CIMT is vary in the frequency, duration, and type of constraint in treatment regimen [12-16] .

2.EFFECT OF MODIFIED CONSTRAINT INDUCED MOVEMENT THERAPY ON HAND FUNCTION OF HEMIPLEGIC CEREBRAL PALSY.

Pranali thakkar et.al., 2014

MCIMT yields clinically as well as statistically significant improvements in both motor function and functional use of the affected upper extremity in children between the ages of 2 and 8 years with hemiplegic cerebral palsy.

Studies in adults following stroke have provided evidence of adaptation in the brain following CIMT[17-18]Since the potential for central nervous system plasticity in young children is increased relative to adults, [19-21] it ispostulated that this approach might prove to be especially effective in children.[22] In one study found that bilateralcortical activation was increased following mCIMT including higher levels of activity in the contralateral sensorimotor cortex. This suggests that with mCIMT, cortical reorganization occurs as new pathways between the damaged and healthy cortical hemisphere are made and control of the affected UE moves towards coming from the contralateral (lesion) hemisphere rather than solelyfrom the ipsilateral hemisphere.Secondly, The motorlearning literature suggests that CIMT employs massedpractice to increase the tendency of patients to use theirmore impaired limb, and thereby induces a use-dependentfunctional reorganization of brain structures.[23]

3. EVIDENCE – BASED CARE GUIDELINE FOR PEDIATRIC CONSTRAINT INDUCED MOVEMENT THERAPY.

Novak et.al.,2013

A growing body of evidence suggests that the inclusion of constraint induced movement therapy(CIMT) in the therapeutic programming may be beneficial for patients with hemiplegia .CIMT is an intervention in which a constraint is utilized on the unaffected hand of a person with hemiplegia to improve functioning of their involved upper extremity.

4.PHYSICAL MANAGEMENT OF CHILDREN WITH CEREBRAL PALSY . Masciento et al.,2009

Although studies vary regarding the restriction duration within the day ,the concentrated repetitive training of the involved extremity 3-6 hours a day with the aim of shaping motor behaviour has been shown to be effective.

HAND-ARM BIMANUAL INTENSIVE THERAPY

5.EFFICACY OF A HAND-ARM BIMANUAL INTENSIVE THERAPYIN CHILDREN WITH HEMIPLEGIC CEREBRAL PALSY:A RANDOMISED CONTROL TRIAL 2007

HABIT uses the principles of motor learning,and neuroplasticity to address bimanual impairements.children were engaged in play and functional activities that provided structured bimanual practice 6 hours per day for 10 days.

6.DEVELOPMENT OF HAND- ARM BIMANUAL INTENSIVE TRAINING (HABIT) FOR IMPROVING BIMANUAL COORDINATION IN CHILDREN WITH HEMIPLEGIC CEREBRAL PALSY .

Charles j et.al.,2006

HABIT retains the two major elements of pediatric constraint induced therapy (intensive structured practice and child –friendliness)extensive targeted practice can be provided in a child –friendly manner without using a physical restraint,although the efficacy of such an approach remains to be determined..

7.BIMANUAL COORDINATION DURING A GOAL-DIRECTED TASK IN CHILDREN WITH HEMIPLEGIC CEREBRAL PALSY .DEPARTMENT OF BIOBEHAVIOURAL SCIENCES ,TEACHERS COLLEGE,COLUMBIA UNIVERSITY,NEWYORK.2004

Movement speed might facilitate better bimanual coordination.Interestingly ,faster speed facilitated better bimanual coordination for the children with hemiplegic CP.

BOX AND BLOCK TEST

8.MATHIOWETZ AND ASSOCIATES

Reliability**:** Several studies have demonstrated high reliability with this tool. According to Mathiowetz and associates (1985a), test-retest reliability yielded rho coefficients of 0.937 and 0.976 for the left and right hands, respectively. Interrater reliabilities were 1.0 and 0.999 for the right and left hands, respectively.

Validity: Validity was established by correlations with Minnesota Rate of Manipulation Test-Placing (0.91). Test scores discriminated between populations with and without disabilities.

9.NORMATIVE DATA FOR MODIFIED BOX AND BLOCKS TEST MEASURING UPPER-LIMB FUNCTION VIA MOTION CAPTURE. Jacqueline s. et.al.,2014

We chose to use the BB test because it is widely used clinically as a functional performance metric. The BB test has strong clinical utility in the assessment of neurologic impairment musculoskeletal impairment and in the elderly . It provides information on performance (number of blocks moved as a proxy of speed) but not on how the body is actually moving.

SPASTIC HEMIPLEGIC CEREBRAL PALSY

10.CEREBRAL PALSY–DEFINITION, CLASSIFICATION, ETIOLOGY AND EARLY DIAGNOSIS .,

chitra sankar., et.al.,2005

Spastic hemiparesis is a unilateral paresis with upperlimbs more severely affected than the lower limbs. It isseen in 56% of term infants and 17% of preterm infants.Pathogenesis is multifactorial. Voluntary movements areimpaired with hand functions being most affected. Pincergrasp of the thumb, extension of the wrist and supinationof the forearm are affected. In the lower limb, dorsiflexionand aversion of the foot are most impaired. There isincreased flexor tone with hemiparetic posture, flexion atthe elbow and wrist, knees and equines position of thefoot. Palmer grasp may persist for many years. Sensoryabnormalities in the affected limbs are common.Sterognosis impaired most frequently. 2 pointdiscrimination and position sense is also defective.Seizures occur in more than 50%. Visual field defects,homonymous hemianopia, cranial nerve abnormalities most commonly facial nerve palsies are seen.

11. INTRAMUSCULAR CONNECTIVE TISSUE DIFFERENCES IN SPASTIC AND CONTROL MUSCLE: A MECHANICAL AND HISTOLOGICAL STUDY.
De bruin m, et.al., 2014.

Cerebral palsy (CP) of the spastic type is a neurological disorder characterized by a velocity-dependent increase in tonic stretch reflexes with exaggerated tendon jerks. Secondary to the spasticity, muscle adaptation is presumed to contribute to limitations in the passive range of joint motion. However, the mechanisms underlying these limitations are unknown. Using biopsies, we compared mechanical as well as histological properties of flexor carpi ulnaris muscle (FCU) from CP patients (n=29) and healthy controls (n=10). The sarcomere slack length (mean 2.5 μm, SEM 0.05) and slope of the normalized sarcomere length-tension characteristics of spastic fascicle segments and single myofibre segments were not different from those of control muscle. Fibre type distribution also showed no significant differences. Fibre size was significantly smaller (1933 μm2, SEM 190) in spastic muscle

CHAPTER-III

MATERIALS AND METHODOLOGY

3.1 **STUDY DESIGN**:

Comparative study

3.2 **POPULATION**:

Cerebral palsy children

SAMPLE:

Spastic hemiplegic cerebral palsy children

SAMPLE SIZE:

30 children

3.3**SAMPLING TECHNIQUE**

Children were allocated into Group-A and Group-B by lot system

GROUP A-15 children(received MCIMT)

GROUP B-15 children(received HABIT)

3.4 **SAMPLING METHOD**:

Convenient sampling , randomly allocated

3.5**STUDY DURATION:**

MCIMT: 3 hours per day,3 days per week for 3 months

Total number of session:36 sessions

HABIT: 3 hours per day ,3 days per week for 3 months

Total number of session:36 sessions

3.6 SELECTION CRITERIA

❖ INCLUSION CRITERIA:

- Children diagnosed as spastic hemiplegic cerebral palsy reported by a physician

- Age:6-8 years

- Both male and female children were included

- Able to attend the tasks and follow simple commands

- Patients who were willing to commit for an intensive therapy program and agree tocease all other upper limb therapeutic intervention for 3 months period of the trial.

- MAS score greater than 1 but lesser than 3

❖ EXCLUSION CRITERIA:

- Visual problems

- Prior upper limb surgery

- Uncontrollable seizures

- Botulinium toxin A injection in the upper limb within 6 months prior

3.7.STUDY SETTING

FFC –Family For Children Coimbatore.

3.8 PARAMETERS

Outcome measures

- Box and block test

3.9 MATERIALS USED:

-Different sized &shaped materials such as

Pen

Pencil,

Sharpener

Rubber,

Toys

Glove

Mat

Work diary

3.10 PROCEDURE:

This study was approved by ethical committee of PPG College of physiotherapy Coimbatore. Permission of outcome measure scale (BOX AND BLOCK TEST) was taken by email from the the author. Informed consent was got from the participation of the children and their parents prior to the study..

30 children who were undergoing conventional physiotherapy as their routine and who met the inclusion criteria participated in the study.15 children were given MCIMT and 15 children were given HABIT.

MODIFIED CONSTRAINT INDUCED MOVEMENT THERAPY:

Children were restrained of the non involved extremity using a glove and engaged in normal activities .Duration of the intervention is 3 hours per day,3 days per week for 3 months including therapy time and home program which can be split into different sessions of no less than 30 minutes duration.

Children wore a fairly comfortable glove, as a restraint up to wrist is used which covers fingers, thumb and hand to avoid hand function of unaffected side. The children were however allowed to use the hand for support or for breaking a fall.

TREATMENT PROTOCOL

- Reach out activities (forward, Lateral and backward reach)
- Grasping and releasing activities (different sized & shaped things)
- Fine motor movements
- .For improving strength Hand weight bearing exercise
- Functional ADL and play activities
- Goal oriented activities

Activities were facilitated by using simple verbal commands, encouragement, toys, demonstration and assistance was given when needed..Families were provided with specific goals after each session. Logbook (Work diary) - was given to primary care giver for collecting details of child activity during that 3 hour time period.

HAND –ARM BIMANUAL INTENSIVE TRAINING:

HABIT retains the two elements of paediatric CIMT and similarly engages the child in bimanual activities 3 hours per day for 3 days per week for 3 months

3.11 STATISTICAL TOOLS:

In this study for statistical part paired‘t’ test and independent‘t ‘test was used.

Formula: Paired‘t’ test:

$$T = \frac{\sum d}{\frac{\sqrt{n(\Sigma d2) - (\Sigma d)2}}{N-1}}$$

d = difference of pre and post value

d^2 = square of mean difference between pre and post value

n = number of subjects

Formula: independent‘t ‘test:

$$t = \frac{\overline{X_A} - \overline{X_B}}{\frac{\sqrt{\sum x^2{}_A + \sum x^2{}_B}}{n_A + n_B - 2} \times \frac{1}{n_A} \times \frac{1}{n_B}}$$

CHAPTER –IV

DATA ANALYSIS AND RESULTS

This study comprised of two groups, GROUP-A and GROUP –B with 15 subjects in each group. For both the group age range was between 6-8.Data analysis was done for the outcome measure of BOX AND BLOCK TEST by the statistician. Mean ,standard deviation were calculated. Paired t-test and independent 't' test were used for data analysis.

4.1 PAIRED ‘t’ TEST:

	Mean	calculated“t” value	Table value
MCIMT PRE	22.4667	26.053	2.145
MCIMT POST	40.6000		
HABIT PRE	22.8000	19.788	2.145
HABIT POST	44.2000		

TABLE-1 WITHIN GROUP ANALYSIS OF GROUP A AND GROUP B

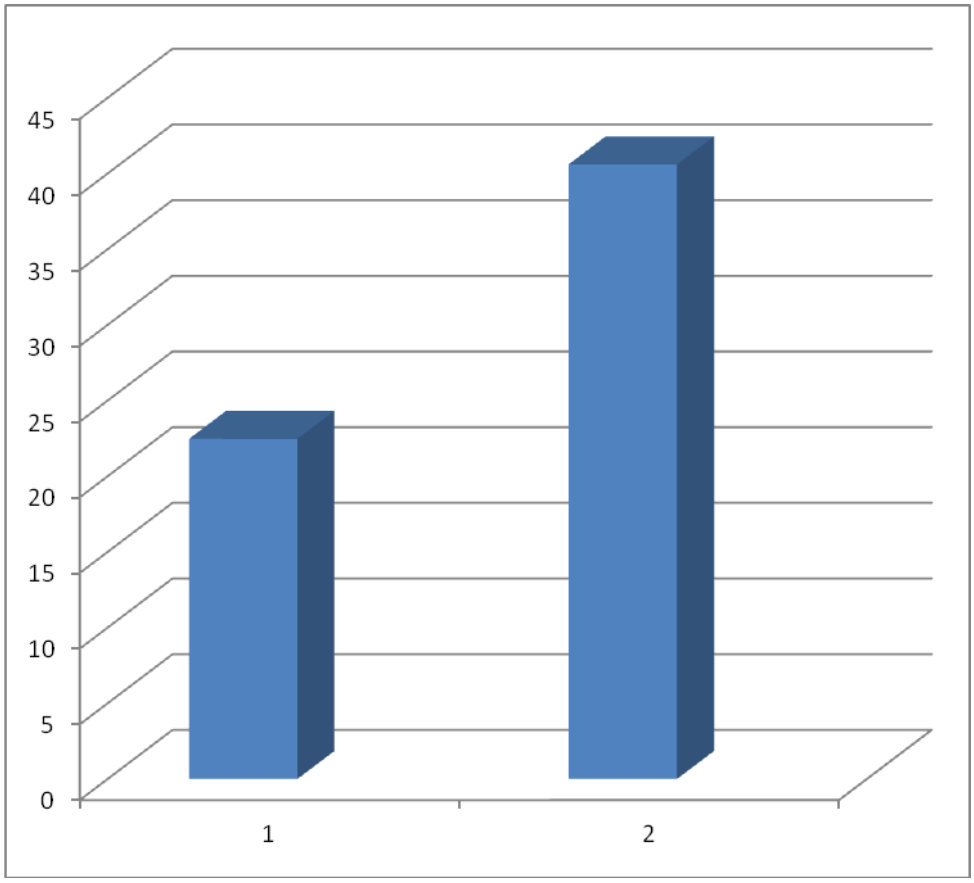
The TABLE -1 displays the PRE and POST values of within group analysis of MCIMT and HABIT. The result showed significant differences as the calculated ‘t’ values (ie.26.053&19.788) is greater than the table value.

4.2 INDEPENDENT ‘t’ TEST:

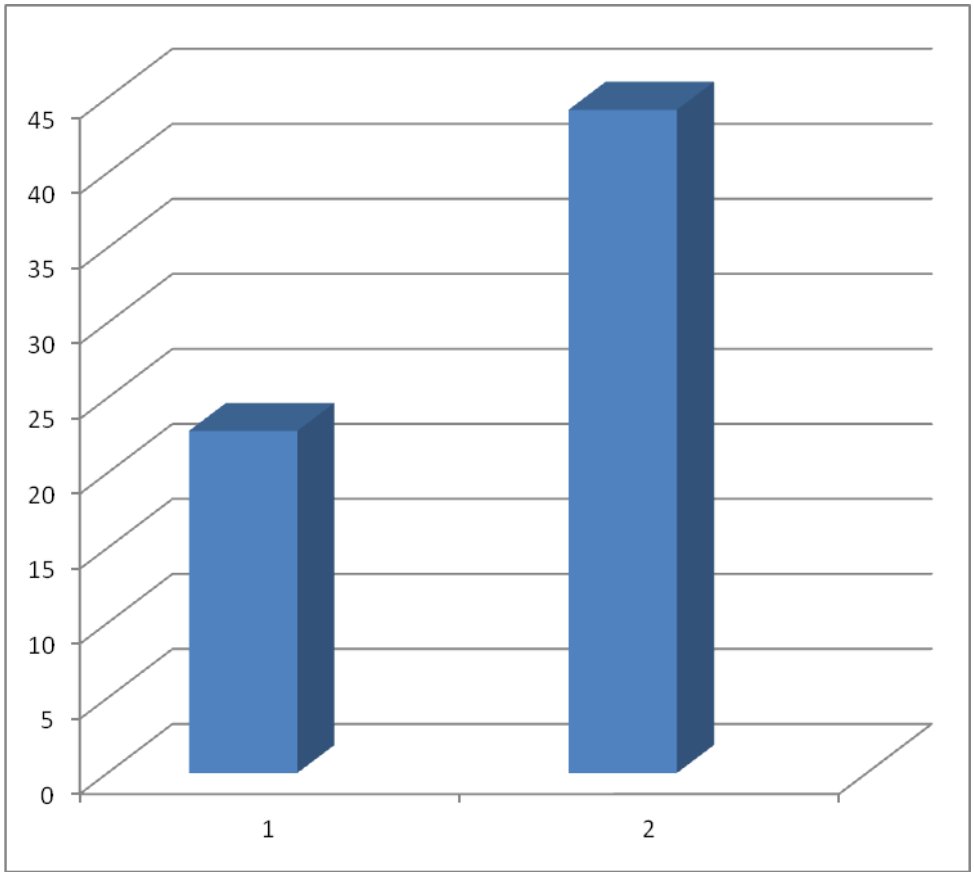
TEST	GROUPS	CALCULATED ‘t’ VALUE	TABLE VALUE
PRE VALUES	MICMT HABIT	0.43	2.045
POST VALUES	MICMT HABIT	2	2.045

TABLE-2 INTRA GROUP ANALYSIS OF GROUP A AND GROUP B

The TABLE-2 displays thevalues of intragroup analysis of MCIMTand HABIT.The result supports the null hypothesis as the table value is greater than the Calculated ‘t’ value.



GRAPH-1 MEAN VALUES BETWEEN PRE AND POST VALUES OF MCIMT



GRAPH-2 : MEAN VALUES BETWEEN PRE AND POST VALUES OF HABIT

RESULTS:

The result showed that HABIT is as effective as MCIMT on improving the gross manual dexterity in spastic cerebral palsy children. Results obtained from the outcome measures suggests that both interventions were moderately effective on improving gross manual dexterity. Thus subjects who were exposed to HABIT recoverd to the same extent as subjects with MCIMT. The statistical results suggests that clinically the treatment can be incorporated into practice but statistically there is no significant difference .So the null hypothesis is accepted.

CHAPTER-V

DISCUSSION

The present study was done to compare the effectiveness of MCIMT and HABIT in improving gross manual dexterity in spastic hemiplegic cerebral palsy children.

Dexterity refers to the physiological functions of the hand and central nervous system that enable the execution of rapid and coordinated hand movements and mobility, without purposeful functioning. Dexterity tasks are generally performed in a short period of time. Such tasks are not representative of daily activities performed continuously throughout the day, in which fatigue may play a role. Moreover, dexterity tasks are too artificial in nature and require too limited of movement patterns to reproduce the meaningful situations encountered in daily life. The Box and Block Test is friendlier and more sensitive to differentiate more affected CP children. Newly developed activity-based interventions, including constraint-induced movement therapy (CIMT) and hand– arm bimanual intensive therapy (HABIT), provide evidence for the improvement of hand functioning such as gross manual dexterity.

Seema et .al. in her study , 'Effects of modified constrained induced movement therapy to improve the upper limb functional activities and gross manual dexterity on hemiparetic cerebral palsy children' stated that the MCIMT had been proven to be effective in improving functional activities and gross manual dexterity of upper limb.The result came in agreement with Eliassion et.al,Rostamie et.al,Gordan and Charles and choudhary et.al.Improving functions may be ,using the affected hand more in functional activities and also it has long been believed that the brains of children are felt to have more capability than adults for cortical reorganisation and it has been suggested that children with asymmetric upper extremity motor control may also benefit from constraint therapy .MCIMT is effective in improving motor recovery in patients with hemiplegia because of increased size and shifting of cortical area neural firing after CIMT[24]

One fundamental rehabilitation goal is to improve the child's ability to manage daily activities necessary for autonomous living [25]. Most conventional treatments endeavor to reduce hand impairments by normalizing movement patterns, stretching spas- tic muscles, strengthening weakened muscles, etc., assuming that body impairments are largely responsible for the difficulties experienced in daily activities . However, the ICF stresses the importance of addressing the impact of CP on the child's hand functioning beyond the body level. The ICF has contributed to a recent shift away from body functions and toward the activi- ties and participation perspectives [26] . Recent neurorehabilitation concepts have emphasized what children do in their actual envi- ronment, rather than what they can do in a standardized environment [27] .Newly developed activity-based interventions, including constraint-induced movement therapy (CIMT) [28] and hand– arm bimanual intensive therapy (HABIT) [29] , provide evidence for the improvement of hand functioning [30-32] .

.

As the previous studies showed significant improvement with the interventions MICMT and HABIT, the present study can be regarded as preliminary in light of its limitations, our data clearly offers potentially helpful clinical guidelines that there is significant difference during within group comparasion of HABIT and MCIMT on improving gross manual dexterity in spastic hemiplegic cerebral palsy children and is a more reliable outcome and therefore it can be incorporated into practice although there the null hypothesis of the study was accepted as there was no significant improvement statistically when the intra group analysis was done.

CHAPTER-VI

SUMMARY AND CONCLUSION

SUMMARY:

In an effort to find out the effectiveness of MCIMT and HABIT on improving gross manual dexterity in spastic hemiplegic cerebral palsy children,30 children were selected using convenient sampling technique and randomly allocated into 2 groups with 15 subjects each.

Group A was treated with MCIMT and Group B was treated with HABIT for a period of 3 months.

The result was analysed with independent t –test which favoured the null hypothesis.

CONCLUSION:

In conclusion ,the planning and implementation of this study on the effectiveness of MCIMT and HABIT in Right hemiplegic cerebral palsy children shows that interventions are safe ,effective and worthwhile . It can be concluded that HABIT is as effective as MCIMT . These treatments can be practiced clinically although there was no statistical difference . Thus the conclusion from this research is that there was no difference between the treatments.

CHAPTER-VII

LIMITATIONS AND SUGGESTIONS

- The study was done within a short duration, so the study can be done for a longer duration for more valid result.

- The study was done with a smaller sample; hence further studies can be conducted with larger samples.

- The study can be analysed with other scales such as PEDIATRIC MOTOR ACTIVITY LOG (PMAL), Assisting hand assessment (AHA).

- This study was done only with Right spastic hemiplegic cerebral palsy children, so other studies can be carried out with left spastic hemiplegic cerebral palsy children

- Similar study can be done with other forms of cerebral palsy.

CHAPTER –VIII

REFERENCES

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CHAPTER-IX

ANNEXURE – I

INFORMED CONSENT FORM

TITLE: A COMPARATIVE STUDY ON THE EFFECTIVENESS OF MODIFIED CONSTRAINT INDUCED MOVEMENT THERAPY(MCIMT) AND HAND-ARM BIMANUAL INTENSIVE THERAPY(HABIT) ON IMPROVING GROSS MANUAL DEXTERITY FOR SPONTANEOUS USE OF AFFECTED RIGHT UPPER EXTREMITY IN RIGHT SPASTIC HEMIPLEGIC CEREBRAL PALSY CHILDREN.

INVESTIGATOR: Dr.JENIFER.C

CO-INVESTIGATOR:PROF.Dr.S.JOEL GODFREY BETRAM

PURPOSE OF THE STUDY:

I _____ have been informed that this study will help clinicians and therapists to find out the effectiveness of modified constraint induced movement therapy and Hand –arm bimanual intensive therapy on improving gross manual dexterity.

PROCEDURE:

I _____ understand that my child will undergo experiment with Dr.JENIFER.C and Dr.S.JOEL GODFREY BETRAM under the direct supervision of the physiotherapist.I am aware that I have to follow therapist's instuction as has been told to me.

RISK AND DISCOMFORT:

I_____understand that there are no potential risks associated with this procedure,and understand that Dr.JENIFER.C and Dr.S.JOEL GODFREY BETRAM will company my child during this procedure.There are no known hazards associated with this procedure.

CONFIDENTIALITY:

I_____ understand that the medical information produced by this study will be confidential. If the data are used for publication in the medical literature or for teaching purpose, no names will be used. Photographs, audio and video tapes will be used without identity for publication and presentation .

PHOTOGRAPHY CONSENT:

Dr. .JENIFER.C and DR.S.JOEL GODFREY BETRAM have explained me that photography of my child are required in order to illustrate various aspects of the study for thesis and other articles, and at the presentation or conference by giving my consent I_____authorize Dr .JENIFER.C and DR.S.JOEL GODFREY BETRAM to use any of my child's photo taken in printed format ,in slides for presentation.

REQUEST FOR MORE INFORMATION:

I_____ understand that I may ask any questions about the study at any time and that Dr.JENIFER.C and Dr.S.JOEL GODFREY BBETRAM are ready to clear my doubts at any time and I need a copy of this consent form for my personal and careful reading.

REFUSAL OR WITHDRAWAL OF PARTICIPATION :

I_____understand that my child's participation is voluntary and I may withdraw consent and discontinue his /her participation at any time with proper explanation and reason.

INJURY STATEMENT

I_____understand the diagnosis/treatment procedure,under the guidance of my therapist,is likely to cause any/no injury .In such case medical attention will be provided ,but no compensation will be provided .I understand my agreement to participate my child in this study and Iam not waiving any legal rights. Dr.JENIFER.C and Dr. S.JOEL GODFREY BETRAM have explained me the purpose of the study,the study procedure and possible risk that my child may experience.

I have read and I have understood this concern to participate as a subject in this study.

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SUBJECT DATE

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WITNESS TO SIGNATURE DATE

We Dr. JENIFER.C and Dr. S.JOEL GODFREY BETRAM have explained the purpose of the research,the procedure required and the possible risks and benefits ,to the best of our ability.

INVESTIGATORS

DATE

1. Dr.JENIFER.C
2.Dr. S.JOEL GODFREY BETRAM

ANNEXURE –II

ASSESSMENT CHART

GENERAL ASSESSMENT OF CHILD

Name

Sex

Address

Presenting complaints

Medical history

Post natal history

Natal history :

History of labour pain:

Type of delivery –full term hospitalization

Condition of child at the time of birth.

Birth cry

Body weight

Jaundice anoxia or asphyxia.

H/O

Previous abortion, still born child or death after birth

Blood relation marriage (consanguity)

Social history –status, caste

Family history –mother, father, sibilings.

Developmental milestones

O/O

Activity of child

Posture of child

Head circumference in cm

Sitting height

Standing height

O/E

Growth parameters

Motor evaluation

Muscle tone

Joint ROM (passive / active)

Muscle power (in case of flaccid CP)

Reflexes

Superficial and deep

Primitive reflexes

Deep tendon reflexes

Oral motor reflexes

Grasp

Fine grasp

- Tip to tip
- Lateral pinch (key holding)
- Opponens
- Tripod (pen holding)

Gross:

- Cylindrical (giass holding)
- Hook grasp (bucket holding)
- Spherical (football holding)

Muscle wasting:

Shortening of leg:

Contractures:

Gait

Sensory evaluation:

- Fine and crude touch
- Cold and hot temperature
- Deep and superficial pain
- Proprioception
- Kinesthetic sensation
- Stereognosis
- Two point discrimination

Cognitive test:

- Response to external environment
- Behaviour
- Sense of colour, size, shape
- Sense of common danger as fire
- Toilet training
- Sense of coins and rupees
- Sense of house hold articles

Activities of daily living

- Self grooming
- Self brushing
- Ambulation (dependentor independent)

COMMUNICATION

Mother should say ,to calculate the IQ of the child .

ANNEXURE-III

MASTER CHART

MCIMTPRE	MCIMTPOST	HABITPRE	HABITPOST
20	34	23	48
22	36	20	35
24	45	27	48
26	48	26	52
21	38	21	38
22	42	22	42
23	42	22	44
20	35	23	50
22	42	20	35
27	46	22	44
23	42	24	50
24	46	20	35
20	36	26	48
21	37	24	48
22	40	22	46